

Amendment and Response

Applicant: Thomas M. Soukup et al.
Serial No.: 10/752,466
Filed: January 6, 2004
Docket No.: H583.104.102
Title: STEERABLE STYLET

IN THE CLAIMS

Please amend claims 60 and 80 as follows:

1. - 59. (Cancelled)

60. (Currently Amended) A steerable stylet, comprising:

a stylet wire comprising a distal region defining a plurality of notches, and a proximal end portion spaced apart from the distal region, the stylet wire having a breaking stress force;

a core wire at least partially disposed within a lumen defined by the stylet wire;

a distal end portion of the core wire being secured to the stylet wire proximate a distal end portion thereof;

an adjustable tensioner mechanism within a housing and operably connected between the proximal end portion of the stylet wire and a proximal end portion of the core wire for applying a relative tension force between the stylet wire and the core wire; and

a spring within the housing and operably arranged between the adjustable tensioner mechanism and the proximal end portion of the core wire to form a safety mechanism to blunt excessive force and prevent breakage of the stylet wire for limiting from the tension force applied between the core wire and the stylet wire whenever the adjustable tensioner mechanism is adjusted.

61. (Previously Presented) The steerable stylet of claim 60 wherein a beam strength of the distal region of the stylet wire is sufficient to cause the stylet wire to return to at least an original position of the stylet wire as the relative tension force is removed from the stylet wire.

62. (Cancelled).

63. (Previously Presented) The steerable stylet of claim 60 wherein the spring is capable of limiting the tension force applied between the core wire and the stylet wire to a limit force that is less than a breaking stress force of the stylet wire.

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64. (Previously Presented) The steerable stylet of claim 60 wherein the spring is comprised of a constant force spring with a maximum tensile retention force less than the breaking stress force of the stylet wire.

65. (Previously Presented) The steerable stylet of claim 60 wherein the breaking stress force of the stylet wire is at least six pounds and a limit force of the spring is less than four pounds.

66. (Previously Presented) The steerable stylet of claim 60 wherein the adjustable tensioner mechanism operably engages with a separate compressible member to increase a force opposing movement of the adjustable tensioner mechanism so as to provide tactile feedback to an operator that is generally indicative of the relative tension force.

67. (Previously Presented) The steerable stylet of claim 60 wherein a portion of the notches defined by the distal region of the stylet wire have progressively decreasing depths.

68. (Previously Presented) The steerable stylet of claim 67 wherein the portion of the notches having progressively decreasing depths comprise between about five percent and about fifty percent of the notches.

69. (Previously Presented) The steerable stylet of claim 67 wherein each of the notches in the portion of the notches having the progressively decreasing depth has a constant decrease in depth between adjacent notches.

70. (Previously Presented) The steerable stylet of claim 67 wherein at least three most proximal notches of the plurality of notches have a progressively decreasing depth with a constant decrease in depth between adjacent notches.

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71. (Previously Presented) The steerable stylet of claim 60 wherein the distal region is defined beginning between 0.050 inches and 1.000 inches proximal to the distal end of the stylet wire and includes at least twenty notches of between 0.005 inches and 0.015 inches longitudinal width with a spacing between adjacent notches of between 0.010 inches and 0.050 inches and a depth of at least ten of the most distal notches of the series being substantially equal to a radius of the stylet wire minus a wall thickness of the stylet wire.

72. (Previously Presented) The steerable stylet of claim 60 wherein the stylet wire includes a plurality of separate sets of notches defined along the distal region of the stylet wire.

73. (Previously Presented) The steerable stylet of claim 72 wherein each set of notches is spaced apart from one another by at least 0.1 inches and each set of notches includes at least a plurality of notches having a longitudinal width of between 0.005 inches and 0.015 inches with a spacing between adjacent notches of between 0.010 inches and 0.050 inches.

74. (Previously Presented) The steerable stylet of claim 72 wherein at least one of the sets of notches includes at least a portion of the notches having a progressively decreasing depth distally to proximally along a series of notches.

75. (Previously Presented) The steerable stylet of claim 72 wherein at least two of the sets of notches have different radial orientations of the notches such that the stylet assembly creates curves in two separate planes in response to the relative tension force.

76. (Previously Presented) The steerable stylet of claim 72 wherein at least two of the sets of notches have different spacings and widths of the notches such that the steerable stylet creates curves at two different times in response to the relative tension force.

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77. (Previously Presented) The steerable stylet of claim 60 wherein the spring is comprised of an elastomeric spring having a maximum compressive retention force less than the breaking stress force of the stylet wire.

78. (Previously Presented) The steerable stylet of claim 60 wherein the distal end portion of the core wire is secured to the distal end portion of the stylet wire without annealing the core wire.

79. (Previously Presented) The steerable stylet of claim 60 wherein the distal end portion of the core wire is secured to the distal end portion of the stylet wire without annealing the stylet wire.

80. (Currently Amended) A steerable stylet, comprising:

a stylet wire comprising a distal region defining a plurality of notches;
a core wire at least partially disposed at within a lumen defined by the stylet wire;
a distal end portion of the core wire being secured to the stylet wire proximate a distal end portion thereof;

a means operably connected between a proximal end portion of the stylet wire and a proximal end portion of the core wire for applying a relative tension force between the stylet wire and the core wire; and

a spring operably arranged between the means for applying a relative tension force and the proximal end portion of the core wire for limiting the relative tension force to a limit force that is less than a breaking stress force of the stylet wire whenever an operator adjusts tension using the means for applying a relative force, such that the spring is a safety mechanism blunting excessive force applied as the tension force to prevent the stylet wire from braking.

81. (Previously Presented) The steerable stylet of claim 80 wherein a beam strength of the distal region of the stylet wire is sufficient to cause the stylet wire to return to at least an original position of the stylet wire as the relative tension force is removed from the stylet wire.

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82. (Previously Presented) The steerable stylet of claim 80 wherein a beam strength of the distal region portion the stylet wire greater than a beam strength of a distal region of the core wire.

83. (Previously Presented) The steerable stylet of claim 80 wherein the means for limiting the relative tension force is capable of limiting the tension force applied between the core wire and the stylet wire to a limit force that is less than a breaking stress force of the stylet wire.

84. (Previously Presented) The steerable stylet of claim 80 wherein the means for limiting the relative tension force is comprised of a constant force spring with a maximum tensile retention force less than the breaking stress force of the stylet wire.

85. (Previously Presented) The steerable stylet of claim 80 wherein the breaking stress force of the stylet wire is at least six pounds and the limit force of the means for limiting the relative tension force is less than four pounds.

86. (Previously Presented) The steerable stylet of claim 80 wherein the means for applying a relative tension force operably engages with a separate compressible member to increase a force opposing movement of the means for applying a relative tension force so as to provide tactile feedback to an operator that is generally indicative of the relative tension force.

87. (Previously Presented) The steerable stylet of claim 80 wherein a portion of the notches defined by the distal region of the stylet wire have progressively decreasing depths.

88. (Previously Presented) The steerable stylet of claim 67 wherein the portion of the notches having progressively decreasing depths comprise between about five percent and about fifty percent of the notches.

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89. (Previously Presented) The steerable stylet of claim 67 wherein each of the notches in the portion of the notches having the progressively decreasing depth has a constant decrease in depth between adjacent notches.

90. (Previously Presented) The steerable stylet of claim 67 wherein at least three most proximal notches of the plurality of notches have a progressively decreasing depth with a constant decrease in depth between adjacent notches.

91. (Previously Presented) The steerable stylet of claim 80 wherein the distal region is defined beginning between 0.050 inches and 1.000 inches proximal to the distal end of the stylet wire and includes at least twenty notches of between 0.005 inches and 0.015 inches longitudinal width with a spacing between adjacent notches of between 0.010 inches and 0.050 inches and a depth of at least ten of the most distal notches of the series being approximately equal to a radius of the stylet wire minus a wall thickness of the stylet wire.

92. (Previously Presented) The steerable stylet of claim 80 wherein the stylet wire includes a plurality of separate sets of notches defined along the distal region of the stylet wire.

93. (Previously Presented) The steerable stylet of claim 92 wherein each set of notches is spaced apart from one another by at least 0.1 inches and each set of notches includes at least a plurality of notches having a longitudinal width of between 0.005 inches and 0.015 inches with a spacing between adjacent notches of between 0.010 inches and 0.050 inches.

94. (Previously Presented) The steerable stylet of claim 92 wherein at least one of the sets of notches includes at least a portion of the notches having a progressively decreasing depth distally to proximally along a series of notches.

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95. (Previously Presented) The steerable stylet of claim 92 wherein at least two of the sets of notches have different radial orientations of the notches such that the steerable stylet creates curves in two separate planes in response to the relative tension force.

96. (Previously Presented) The steerable stylet of claim 92 wherein at least two of the sets of notches have different spacings and widths of the notches such that the stylet assembly creates curves at two different times in response to the relative tension force.

97. (Previously Presented) The steerable stylet of claim 80 wherein the tension limiter is comprised of an elastomeric spring having a maximum compressive retention force less than the breaking stress force of the stylet wire.

98. (Previously Presented) The steerable stylet of claim 80 wherein the distal end portion of the core wire is secured to the distal end portion of the stylet wire without annealing the core wire.

99. (Previously Presented) The steerable stylet of claim 80 wherein the distal end portion of the core wire is secured to the distal end portion of the stylet wire without annealing the stylet wire.